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Reliquiaecava, a new genus of Coralliophilidae (Mollusca, Gastropoda)

by C. MASSIN

Abstract

A new genus *Reliquiaecava gen.n.* is proposed for the species *Leptoconchus robillardi* LIÉNARD, 1870. This new genus is created because the adult and embryonic shells and the ecology of the adult of the above mentioned species are very different from those of species belonging to the genera *Leptoconchus, Coralliophila,* and *Coralliobia,* genera to which the species was formerly assigned in the literature. Probably, the two varieties described in the original description by LIÉNARD, represent two different species.
Key-words: Coralliophilidae, Agariciidae, parasitism, embryonic shell.

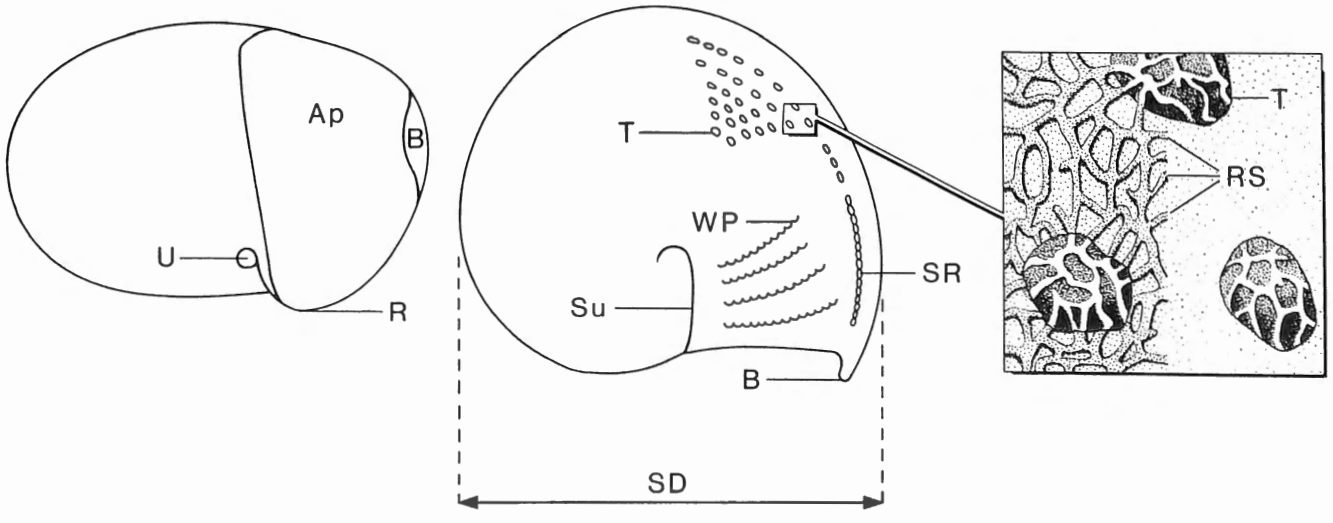
Résumé

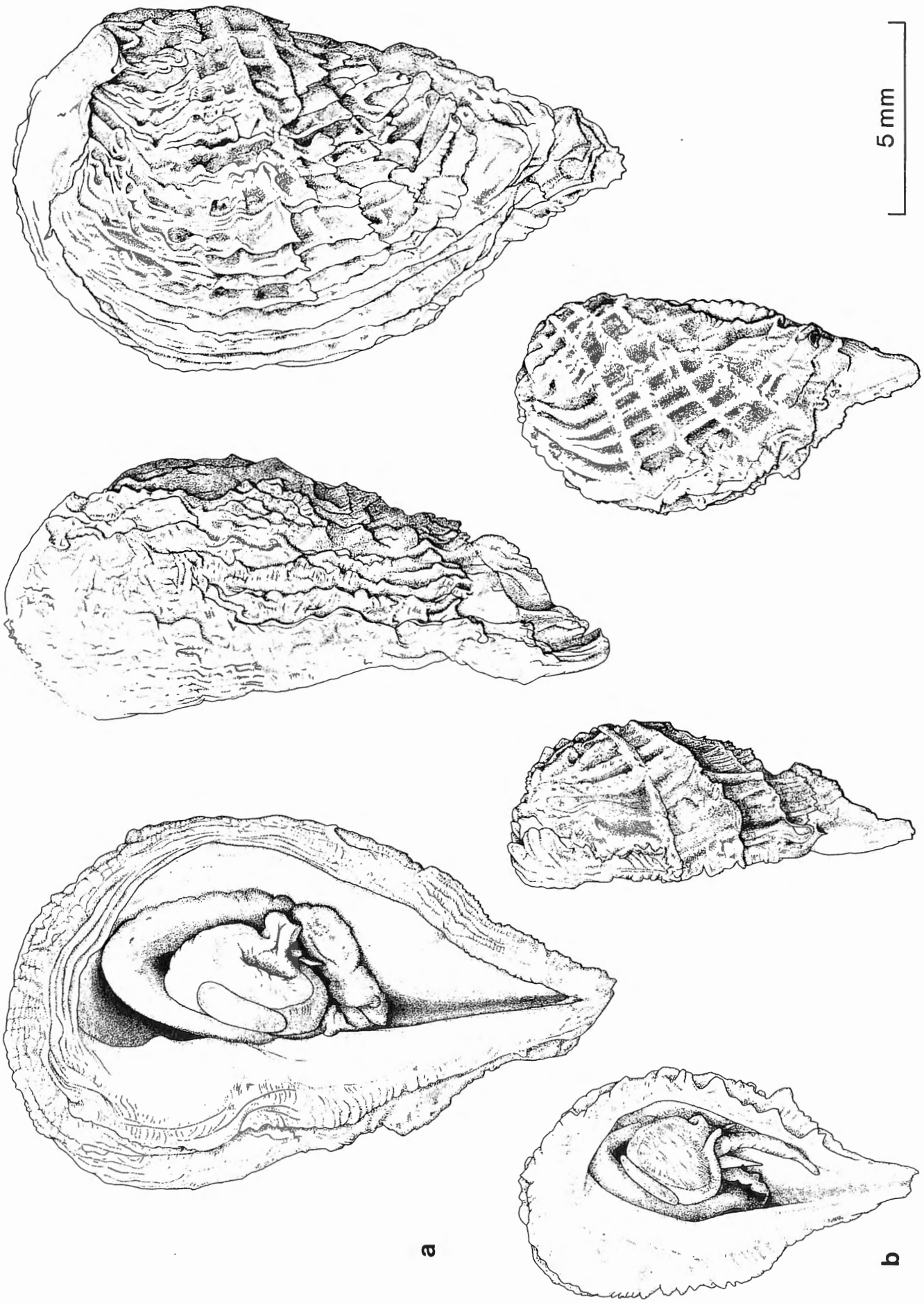
Un nouveau genre, *Reliquiaecava gen.n.* est proposé pour l'espèce *Leptoconchus robillardi* LIÉNARD, 1870. La création de ce nouveau genre est justifiée par les caractéristiques de la coquille adulte et larvaire et par le mode de vie de l'adulte qui sont très différents de ceux que l'on trouve chez les espèces des genres *Leptoconchus, Coralliophila* et *Coralliobia,* genres dans lesquels l'espèce a été classée d'après la littérature. Il est possible que les deux variétés, décrites à l'origine par LIÉNARD, représentent deux espèces différentes.
Mots-clés: Coralliophilidae, Agariciidae, parasitisme, coquille larvaire.

1. Introduction

LIÉNARD (1870) described *Leptoconchus robillardi,* a characteristic species very different from any other known *Leptoconchus* species. It is so different that several authors (see MASSIN 1982, KOSUGE & SUSUKI 1985) have placed this species in the genus (or subgenus) *Coralliobia* and this mainly because of the cancellated sculpture on the shell. Species belonging to the genus *Coralliobia* are supposed to live on the surface of the coral. However, according to living material collected in Papua New Guinea and identified as *C. robillardi,* this species could not be assigned nor to the genus *Coralliobia* nor to the genus *Leptoconchus.* The description of a new genus, *Reliquiaecava gen.n.,* and the redescription of the above mentioned species with notes on the embryonic shell and on the host coral are the object of the present paper.

Fig. 1. *Terminology used for the embryonic shell (protoconch I). Ap: aperture; B: beak; R: rostrum; RS: reticular structure; SD: shell diameter; SR: spiral ridge; Su: suture; T: tubercles; U: umbilicus; WP: wavy pattern.*




5 mm
a
b

2. **Material and methods**

Living and dead specimens were collected around Laing Island (Hansa Bay, Madang Province, Papua New Guinea) by SCUBA diving between 3 and 8 m depth (leg. Cl. MASSIN, 1985, IRScNB, IG 27.026). Shells were found in three different corals species: three colonies of *Gardinoceris planulata* (DANA, 1846) (5 shells), one of *Pavona clavus* (DANA, 1846) (32 shells), and one of *Pavona minuta* WELLS, 1954 (1 shell). The shells with living animals (13) were anesthetized with a solution of 10% $MgCl_2$ for a few hours and then fixed with a solution of 10% neutralized formalin. Embryonic shells from egg capsules were also fixed with 10% neutralized formalin and subsequently prepared for the S.E.M. (see MASSIN 1984). Designation of embryonic shell structures and microstructures is based on the works of SCHELTEMA & SCHELTEMA (1965), BANDEL (1975), VAN DER SPOEL (1976), THIRIOT-QUIÉVREUX (1980), and HAYASHI (1983). The terms used are illustrated in figure 1. In a previous paper (MASSIN 1984) the word "knot" was used to designate regularly spaced excressences on the embryonic shell or protoconch I of *Leptoconchus* spp. "Knot" will be replaced in this paper by "tubercle" more widespread in the literature (see BANDEL 1975, THIRIOT-QUIÉVREUX 1980). "Reticular structure" will likewise replace "meshwork of calcareous tubules".

Material from Papua New Guinea was compared with material from Mauritius (collections of the "Institut royal des Sciences naturelles de Belgique - IRSNB -" and of the "Muséum d'Histoire naturelle de Genève - MHNG -") and from Colombia (Pacific coast) (collections of the Los Angeles County Museum of Natural History - LACM -).

3. **Results**

3.1. *Reliquiaecava gen.n.*

Diagnosis:
Shell whitish, pear shaped with cancellated sculpture on the body whorl. Peristome thickened and lamellose but not expanded. Operculum present. Protoconch I planispiral, covered with tubercles. Surface between the tubercles smooth. Shell living in the dead part of the host coral always just at the limit of the living tissues. Shell generally unable to move in the coral.

Etymology:
Reliquiae = mortal remains, dead parts; *cava* from *cavare* =to bore. *Reliquiaecava* = the one which bores in the dead parts.

Geographical range:
Indo-Pacific from Mauritius to the tropical West coast of America (Colombia).

Coral host:
Agariciidae, principally the genus *Pavona.*

Type species of the genus:
L. robillardi LIÉNARD, 1870.

3.2. *Reliquiaecava robillardi*

Material examined:
IRSNB. IG 4270, 13 specimens; IG 5815, 7 specimens; IG 8890, 1 specimen; IG 10591, 8 specimens; IG 13455, 1 specimen; IG 27026, 38 specimens. MHNG. 9 specimens, 2 of which still in the host coral (*Pavona* sp.). LACM. 35-51 leg R/V Velero III, AHF412-35, 1 specimen.

3.2.1. Adult shell

From the five shells coming from *Gardinoceris planulata,* two form a couple (one male and one female) (Fig.2), the three others being solitary. The shells of the couple possess a very long rostrum (40% of the shell height) and resemble partly the typical form of *L. robillardi* (alpha variety) described by LIÉNARD (1870, 1871). The sexual dimorphism is scarcely visible, the female being slightly larger than the male (Fig. 2).

The three solitary shells were empty, one with a long rostrum and two with a short one (beta variety of LIÉNARD).
The 32 shells from *P. clavus* and the one from *P. minuta* closely resemble the beta variety of LIÉNARD's *L. robillardi* (Figs. 3, 4). Eleven shells from *P. clavus* contained animals: 10 females and 1 undetermined because smashed when opening the coral. Females were found alone or in pairs (Fig. 19). Adult shells measure 15.6 ± 2.7 mm height (n = 31) with a maximum of 20.6 mm. The cancellated aspect of the shell is sometimes weak: only vertical ridges are prominent on the shell, the spiral costulation being scarcely visible except at the base of the shell.

The peristome is thickened by lamellose sheets dentated on the columellar side, sometimes with sharp teeth (Fig. 2). The lamellose sheets form a thick lip all around the peristome (Figs. 2, 3) and cover the apex of the shell. This apex was observed only two times in young shells (6.5 and 8.3 mm height). However, some young shells (6.4 and 8.5 mm height - Fig. 4B -) already have the apex covered. The rostrum is nearly absent or prominent in the beta variety, never exceeding 30% of the

◁ Fig. 2. *Shells of* Reliquiaecava robillardi *living in* Gardinoceris planulata. a: female; b: male.

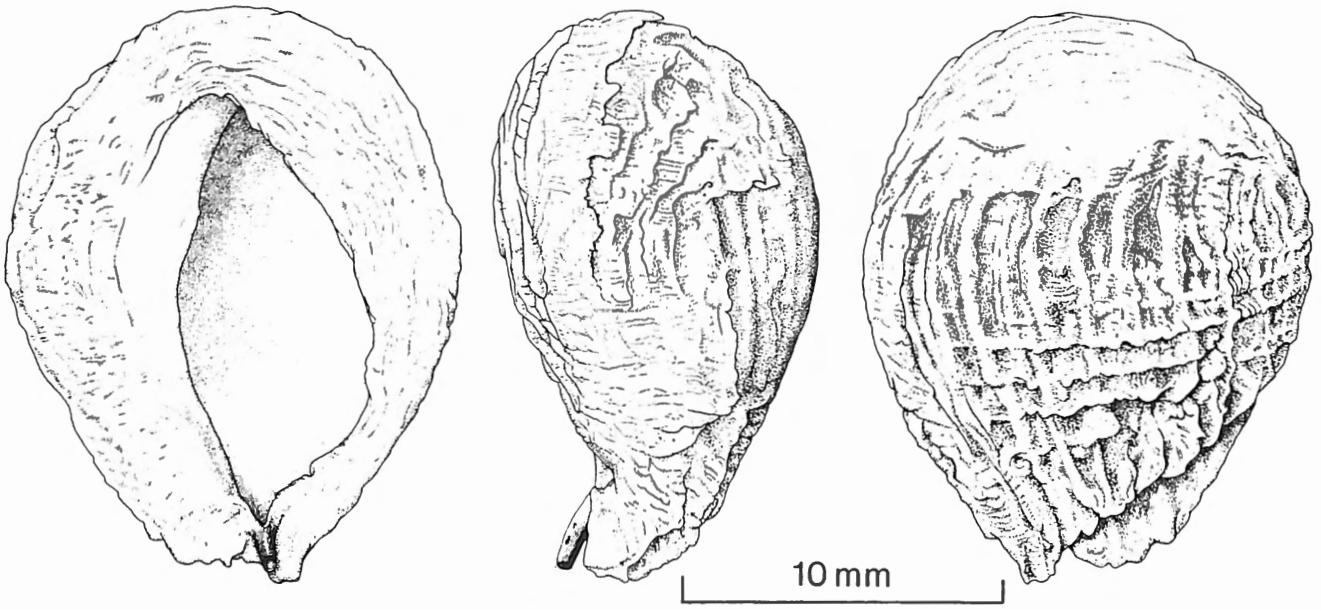
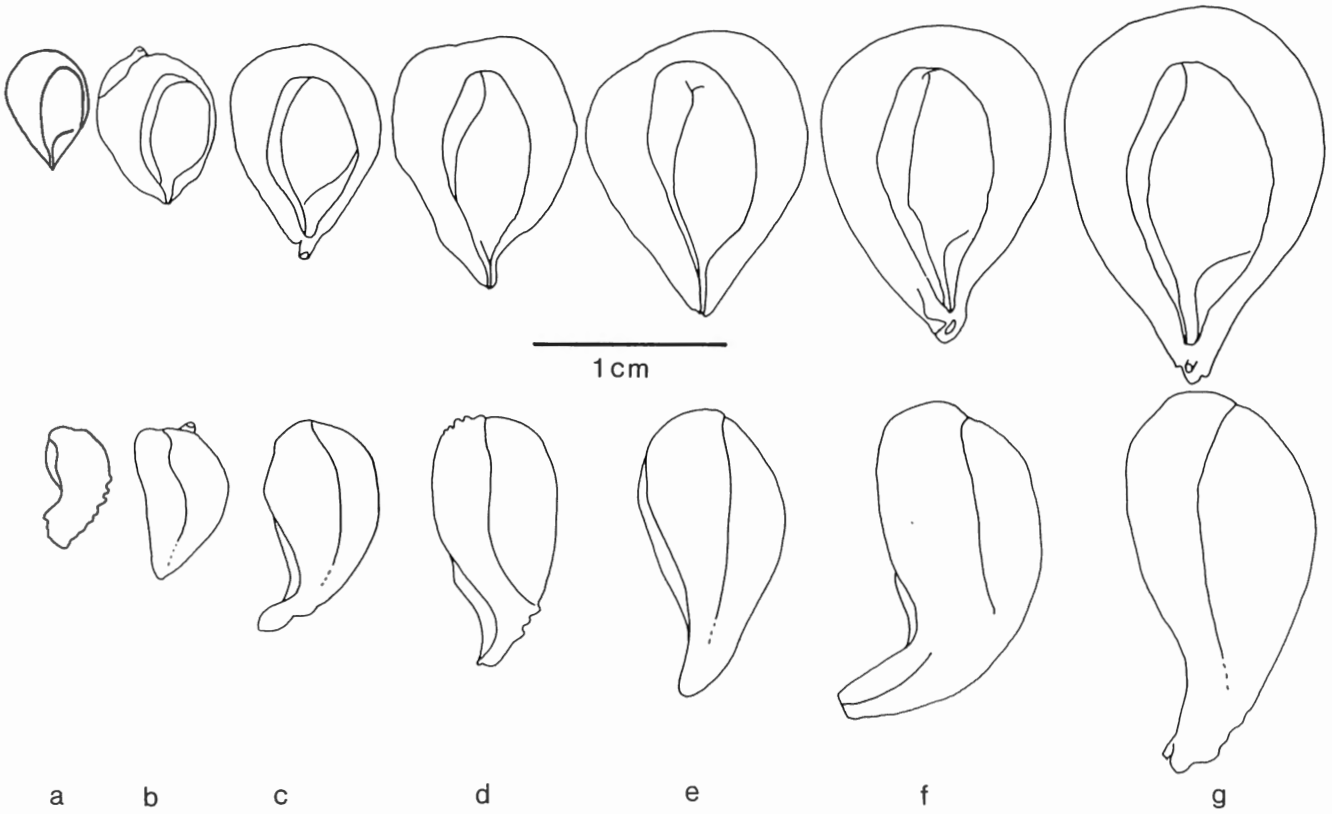


Fig. 3. *Shell (female) of* Reliquiaecava robillardi *living in* Pavona clavus.

shell height (Fig. 4). It is spoutlike, being open over his full length (Fig. 4e) or the end forms a short pipe with a dark brown pigmentation (Fig. 3) whereas the whole shell is generally whitish. The rostrum is not in the prolongation of the columellar axis but bends forwards sometimes nearly up to a right angle (Fig. 4f). The inside of the shell is slightly pearly.

The beta variety is also more abundant in the collections of the IRSNB (28 on 31) and of the MHNG (6 on 7). The specimen from the LACM is a beta variety, 16.4 mm height, presenting only minor variations (callus slightly more developed, right side of the peristome thin) compared with the specimens from Mauritius and Papua New Guinea.

Fig. 4. *Growth series of* Reliquiaecava robillardi *living in* Pavona clavus.

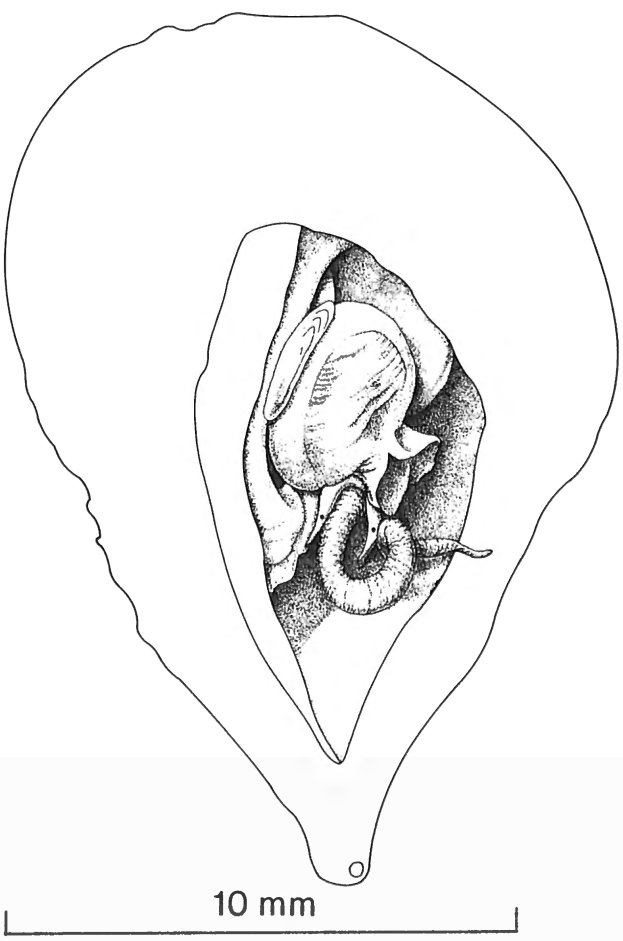


3.2.2. Animal

The animal is similar to many *Leptoconchus* spp. (Fig. 5) (see GOHAR & SOLIMAN 1963, BOUILLON *et al.* 1983, MASSIN 1984). The general colour is creamy white to yellowish, but the siphon is longer and the optic tentacles slender than in the genus *Leptoconchus*. The proboscis is particularly well developed, reaching in full extension more than twice the shell length. It is white with a yellow tip. There is no radula.

The operculum is large (27 ± 4% of the shell aperture height), elliptical, translucent or yellowish and firmly attached to the left posterior part of the foot (Fig. 5).
Only one male (found in *G. planulata*) was observed. A prominent penis, as in *Leptoconchus* spp., located on the right side, emerges from the body behind and slightly above the right optic tentacle. It is crescent-shaped, laterally depressed with a blunt end.
The right side of the female mantle is slightly more developed than the left one but never reaches the unequal mantle development of *Leptoconchus* spp. Among the eleven living females, seven were brooding egg capsules (1 to 4 egg capsules per female, average 3) in the mantle cavity. In two cases the egg capsules sheltered already well developed embryonic shells.
The specimen from the LACM is a female similar to the females from Papua New Guinea.

Fig. 5. *Animal of* Reliquiaecava robillardi *living in* Pavona clavus.

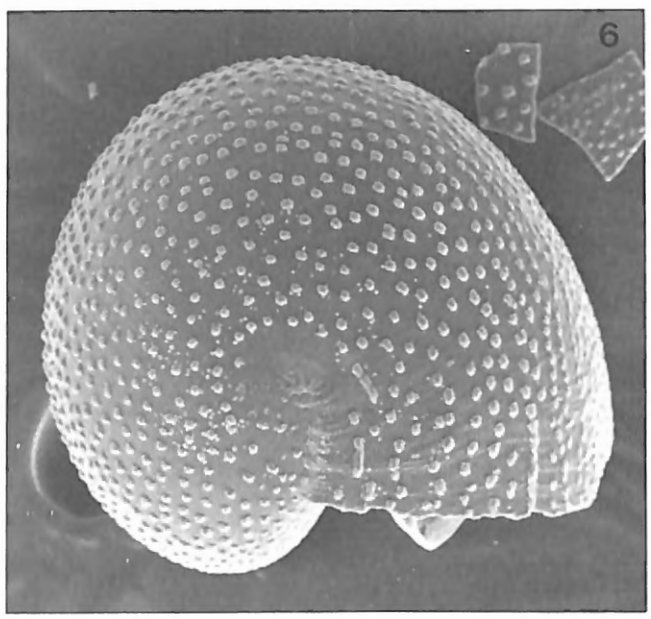


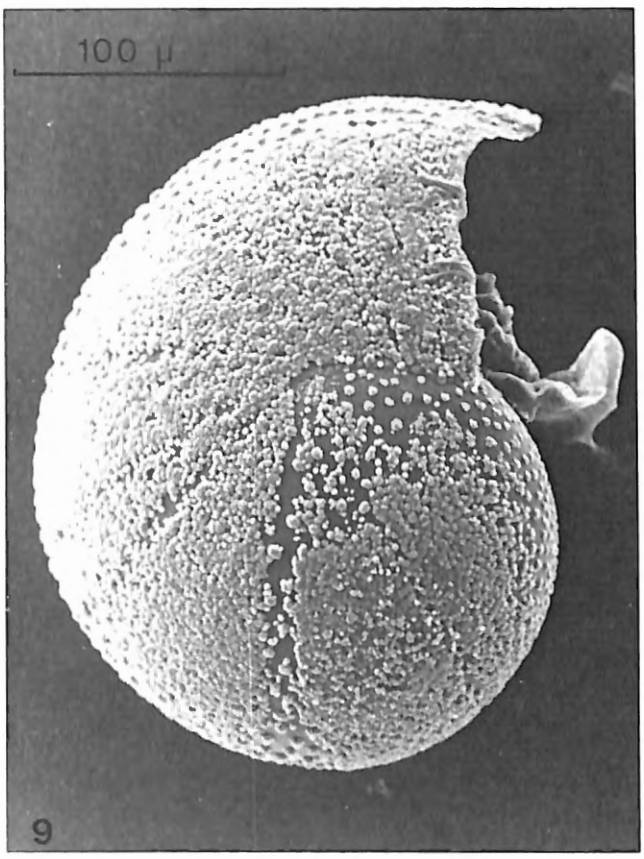
3.2.3. Embryonic shell

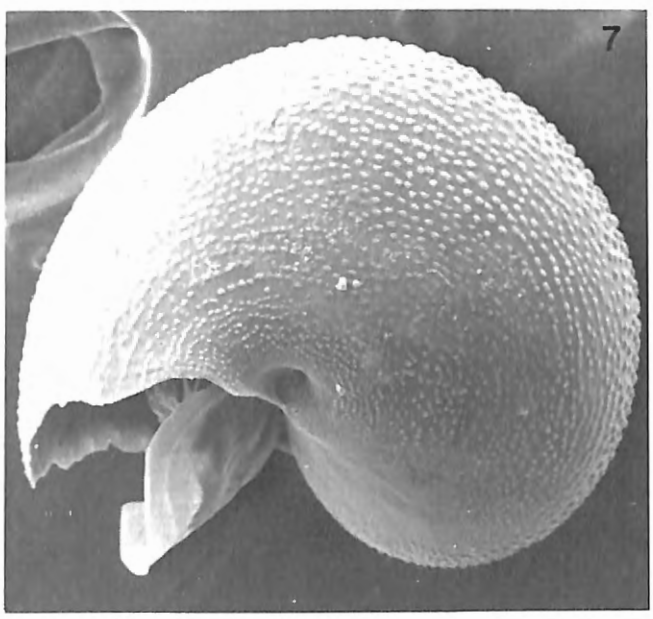
The protoconch I just before hatching is 250 to 270 µm in diameter with a suture line 70 to 80 µm long (Figs. 6, 9). It is a planispiral shell similar to the one of *Leptoconchus vangoethemi* MASSIN, 1984 but slightly more lenticular. The number of the protoconch whorls, following the method of TAYLOR (1975 *in* JABLONSKI & LUTZ 1980) is 1 to 1¼ (Fig. 6). An operculum with spiral growth is present and closes completely the shell aperture. The umbilicus is well marked (Figs. 7, 8). The aperture is triangular with a beak (Fig. 9) and a well developed rostrum.

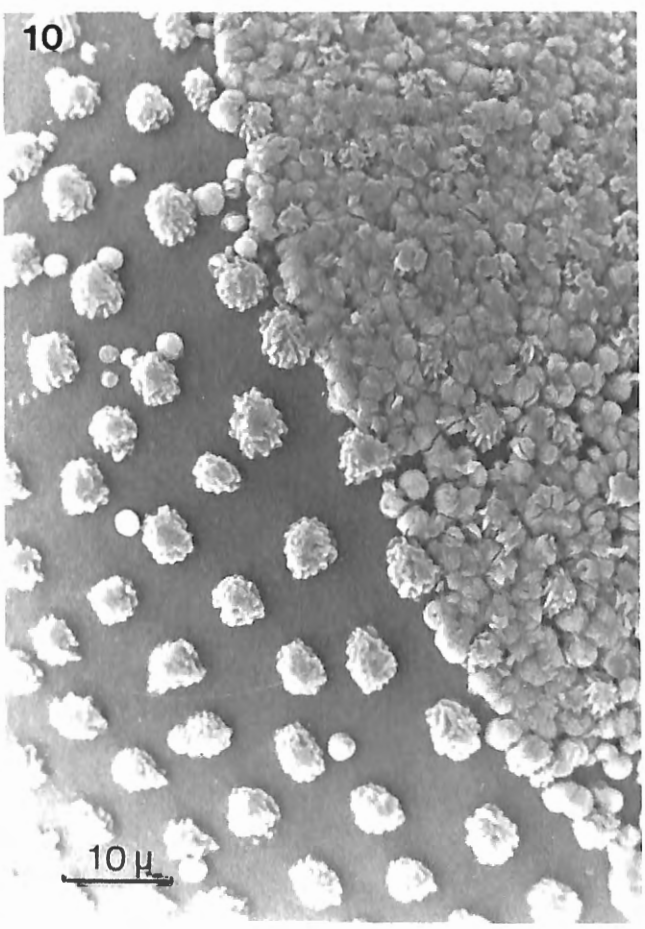
The shell is covered by massive or folded regularly spaced tubercles (Figs. 6, 10, 11, 12). Sometimes they touch one another forming a spiral ridge (Fig. 11). Tubercles are 4 µm in diameter on the apex of the shell and their density is 1.4/100 µm² (Figs. 6, 11). The appearance and distribution of the tubercles are the same on both sides of the suture always free of microsculpture (Fig. 11). As in many embryonic shells, the microsculpture is different between the base and the apex of the shell. At the base the tubercles are smaller, reaching a minimum size (1 to 2 µm in diameter) around the umbilicus (Figs. 7, 8). The transition of the microsculpture between the apex and the base of the shell is progressive (Fig. 8). The area at the left side of the aperture is smooth (Fig. 8). All over the shell, the surface between the tubercles is smooth and no trace of a reticular structure was observed (Figs. 6, 11).
The inner side of the shell is smooth (Fig. 13). The shell wall is 4 µm thick, and composed of two layers: an outer one very thin (0.1 µm) which takes part in the construction of the microsculptures and a thick inner one without a regular arrangement in its structure (Fig. 14). However, sometimes an orientation of the calcium deposit can be seen: deposits are perpendicular to the shell surface in the inner part and parallel to it in the outer part.

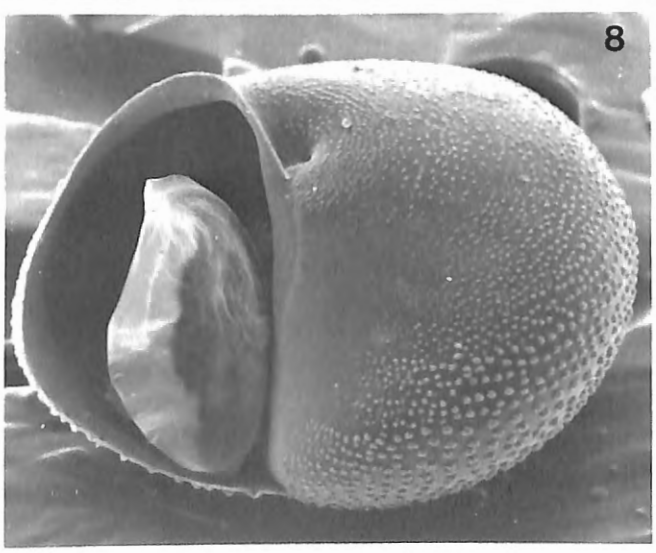
From the early beginning of the shell construction, calcareous excressences, smaller than the tubercles, can be seen on the upper half of the shell (Fig. 9). They are 1 to 2 µm in diameter and their structure is quite different from the tubercles. They look like "desert roses" (Fig. 8). They are sparse or cover completely the shell top (Fig. 9). The transition between covered and non covered shell surface is abrupt (Fig. 10).
One of the observed teleoconch (8.3 mm in height) possesses a little smooth and translucent bump on the apex. It corresponds to the protoconch or larval shell



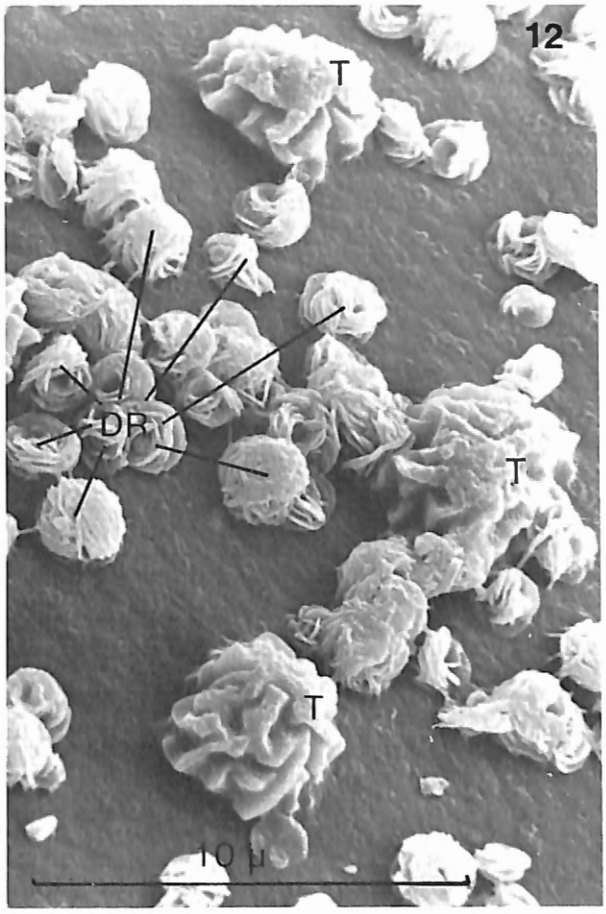


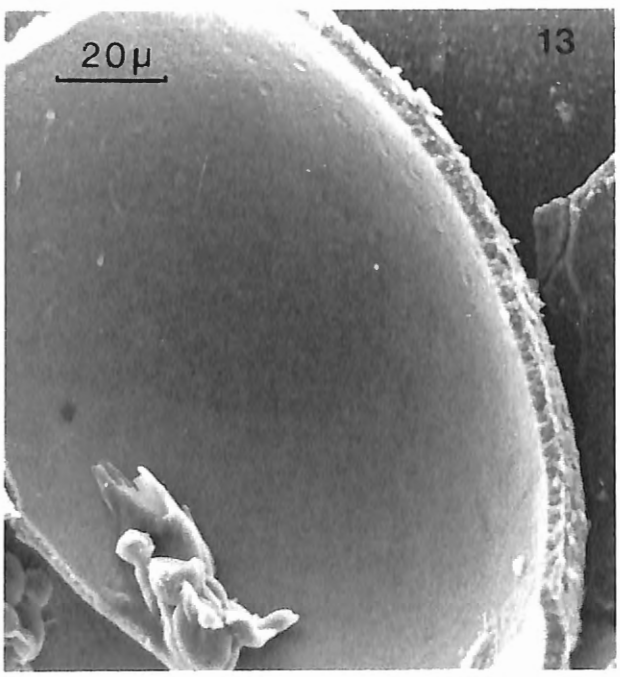


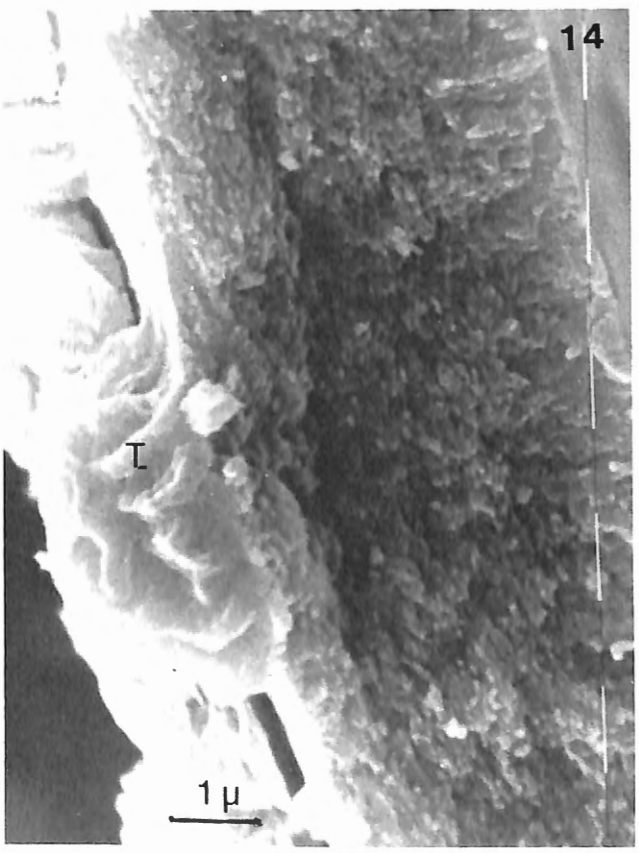




Figs. 6 to 10. *Embryonic shell of* Reliquiaecava robillardi *living in* Pavona clavus*; 6 to 9, same scale; 6: apex; 7: base; 8: lateral view; 9: apex covered with 'desert roses'; 10: limit between surfaces covered (at right) and non covered (at left) by 'desert roses'.*







Figs. 11 to 14. *Embryonic shell of* Reliquiaecava robillardi *living in* Pavona clavus. *11: detail of the apex with suture line (SL); 12: detail of the shell surface with tubercles (T) and 'desert roses' (DR); 13: internal face of the shell; 14: thickness of the shell. T: tubercle.*

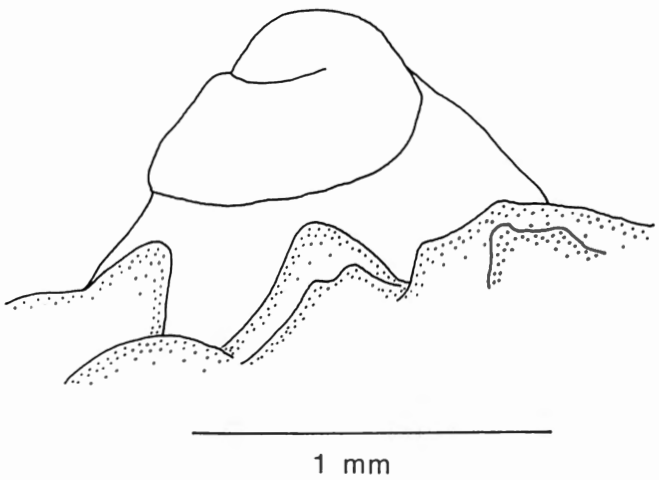


Fig. 15. *Protoconch of* Reliquiaecava robillardi *(enlargment of the apex of the shell from Fig. 4b).*

and has 3 whorls (Fig. 15). Microsculptures are no more visible except some transversal ribs on the last whorl. Transition between the protoconch and the teleoconch is abrupt (Fig. 15).

3.2.4. Relations with the host coral

The three collected species of coral belong to the family Agariciidae. From the five colonies, two (the *Pavona clavus* and one *Gardinoceris planulata*) were collected on a protected area at the entrance of the lagoon whereas the three others (the *P. minuta* and two *G. planulata* came from the East side of Laing Island (Fig. 16). This side is windward and in shallow water the wave movement is always important.

The molluscs were always found living in the dead part of the coral colony just at the limit of the living tissue or at a few centimeters below it.

3.2.4.1. *Gardinoceris planulata*

The colonies of *Gardinoceris planulata* were massive dome shaped coral (from 10 to 15 cm in diameter) with a laminar edge. Shells lay horizontally in the coral (Fig. 17) with the aperture of the shell upwards. The tip of the rostrum was slightly protruding outside just under the laminar egde of the colony. The opening of the burrow was large but not enough to allow the animal to move out. There was no secretion in the burrow and only once, possible traces of underlying older burrow were visible. The burrow is not longer than the shell.

The *G. planulata* coming from the lagoon contained the couple of living animals: a male and a female lying side by side with largely joining burrows. The two *G. planulata* coming from the East side of the island contain isolated dead shells.

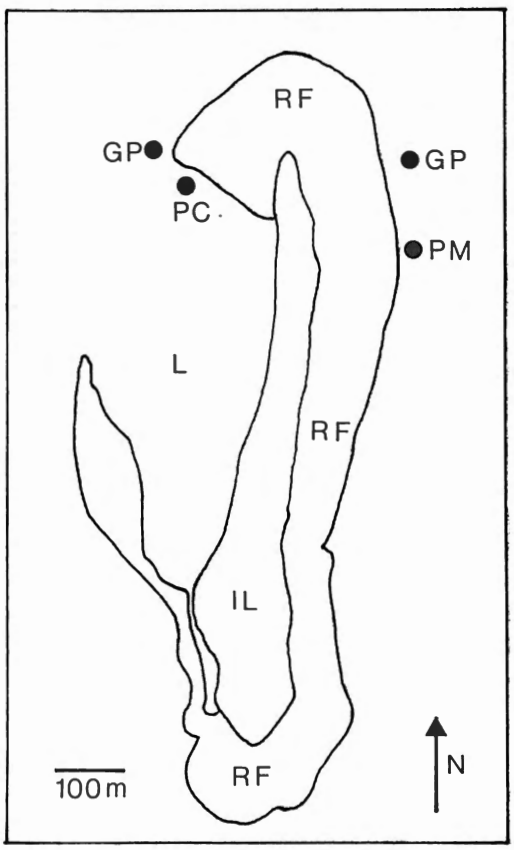
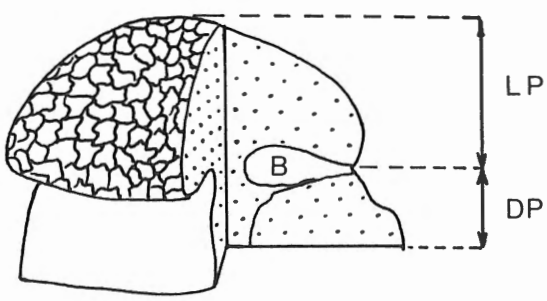


Fig. 16. *Location of the coral colonies around Laing Island. IL: island; GP:* Gardinoceris planulata*; L: lagoon; PC:* Pavona clavus*; PM:* Pavona minuta*; RF: reef flat.*

3.2.4.2. *Pavona minuta*

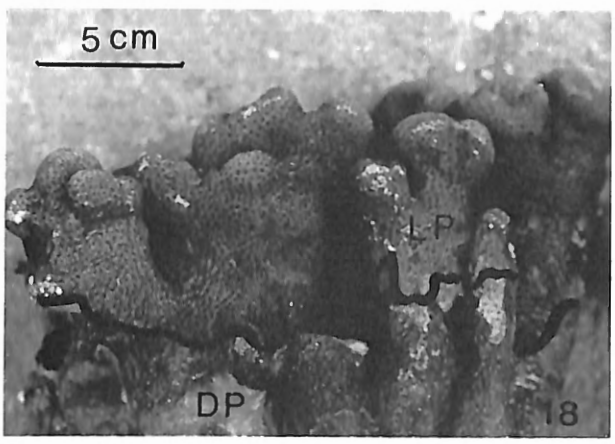
The colony of *Pavona minuta* was massive, composed of large flat plates with a hillocky surface. The plate containing the shell was 25 cm long and 10 cm thick. The dead shell was embedded at the base of the coral. The shell occupied all the burrow and there was no trace of underlying older burrow.

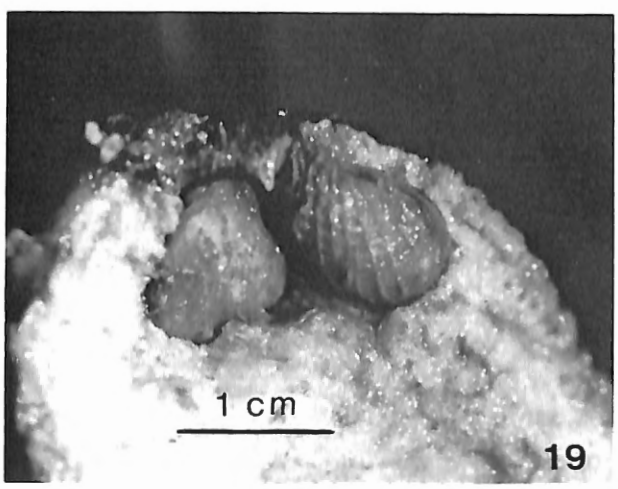
Fig. 17. *Burrow of* Reliquiaecava robillardi *in* Gardinoceris planulata.

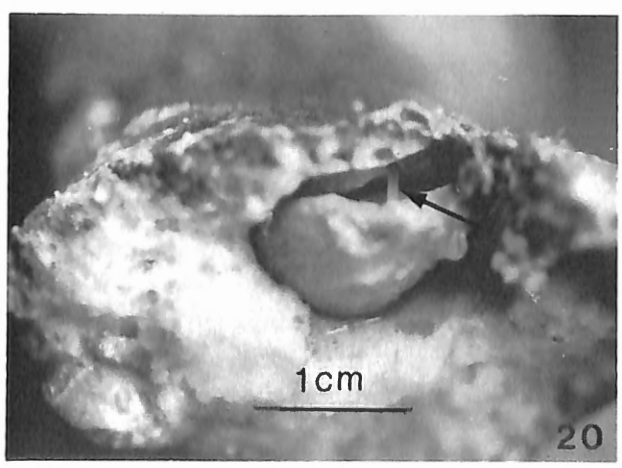


3.2.4.3. *Pavona clavus*

The colony of *Pavona clavus* is large (more than 150 cm in diameter), composed of vertical columns (Fig. 18) 3 to 9 cm in diameter. Very large columns were elliptical in cross section whereas small ones were rounded. The dead base of each column was overgrown by sponges and algae (Fig. 18). Living molluscs were always found just at the border between dead and living coral or at a few centimeters (2 to 3) under this border. At more than 3 cm from the living coral, only dead shells were found. If a dead surface appears in the living part of the colony it could also be occupied by a living mollusc. A maximum of 2 living molluscs were found in each column.







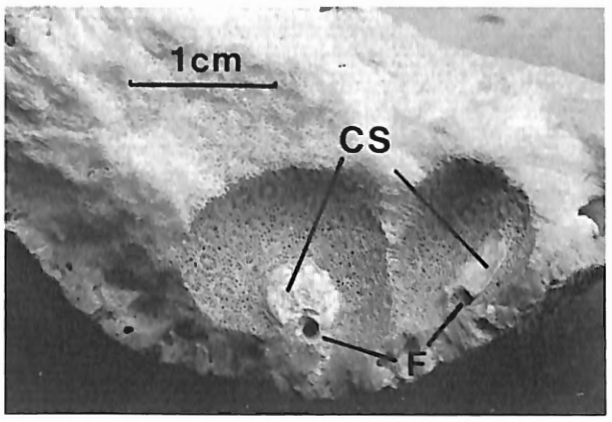


Fig. 21. *Burrows of* Reliquiaecava robillardi *in* Pavona clavus. *CS: calcareous secretion of the foot; F: beginning of the funnel dug by the proboscis.*

Shell main axis is nearly parallel to the coral surface (Fig. 22) with the shell apex up. The spoutlike end of the rostrum protrudes slightly outside. The opening on the coral surface is irregular and far larger than the shell rostrum. The siphon was never observed during the day. Due to its brownish colour and epibiont covering, the tip of the rostrum is very difficult to detect on the dead coral surface during SCUBA diving observations.

The burrow and the shell have nearly the same size and there is no trace of underlying older burrow. There is no secretion covering the wall of the burrow except under the foot of the mollusc. This secretion (Fig. 21), 6 to 10 mm in length and located on the upper face of the burrow, is generally thick (up to 1 mm) but sometimes so thin that the underlying structures of the coral can still be seen. In front of this calcareous secretion opens a hole (1 to 2 mm in diameter) (Fig. 21) which is the starting point of a tunnel running upward and parallel to and 3 to 5 mm below the coral surface (Fig. 22). This tunnel dug by the proboscis (Fig. 20) is lined by a thin calcareous secretion and always ends in the living tissues of the coral.

Among the specimens of *R. robillardi* from the MHNG, 2 were still embedded in their host coral. One of this coral was no more identifiable. The other undoubtedly belongs to the genus *Pavona* and is

Fig. 18. *General view of a part of the colony of* Pavona clavus. *DP: dead part; LP: living part.*

Fig. 19. *Pair of* Reliquiaecava robillardi *in* Pavona clavus.

Fig. 20. *Female of* Reliquiaecava robillardi *in* Pavona clavus *with the proboscis (arrow) still inserted in the host coral.*

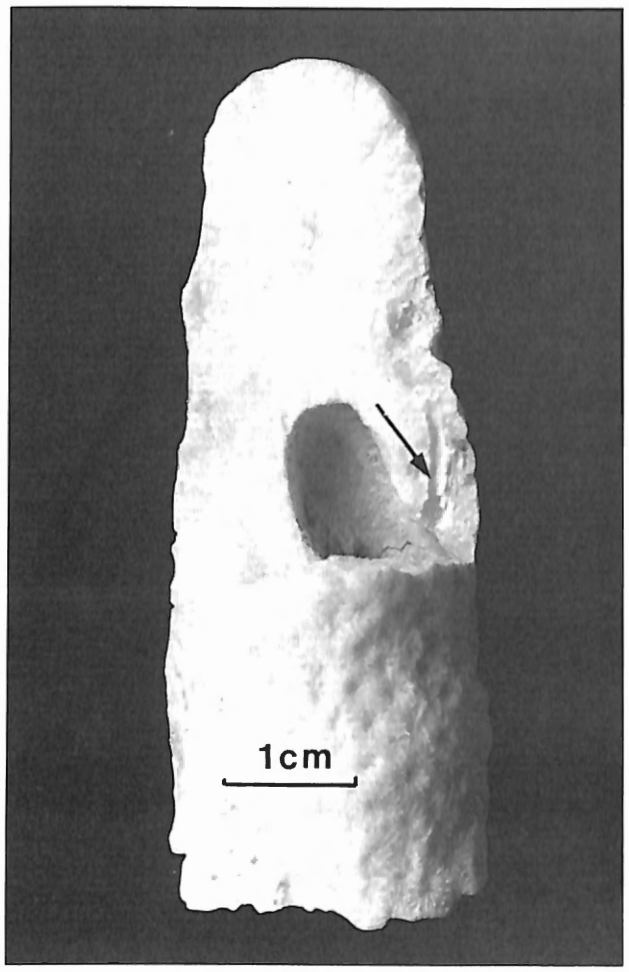


Fig. 22. *Burrow of* Reliquiaecava robillardi *in* Pavona clavus. *The arrow indicates the funnel running parallel to the coral surface.*

probably a *Pavona clavus*. The position of the shell in the coral and all the characteristics of the burrow are absolutely the same than the ones of the material from Papua New Guinea.
All the living gastropods were females. Six of them were found alone and four in pairs. Three of the pairs were composed of a female and a dead shell, the fourth pair being two living females. The six solitary females were brooding egg capsules. No living male was observed.

4. **Discussion**

The genus *Coralliobia* was described by H. & A. ADAMS (1853) as a subgenus of *Leptoconchus*. These authors mentioned for the genus *Leptoconchus* 'take up abode in corals' but nothing about the ecology of *Coralliobia* . Most of the subsequent authors observing the animal of *Coralliobia fimbriata,* the type species of the genus, with the host coral, described it as living firmly fixed on the coral (FISCHER 1887, SMITH 1899, SOWERBY 1919, KAY 1979, KOSUGE & SUZUKI 1985). This character is part of the definition of the subgenus *Coralliobia* according to KOSUGE & SUZUKI (1985) and I agree with this.
As the species *L. robillardi* lives obviously in the coral skeleton, it is a major reason to separate it from the genus (or subgenus) *Coralliobia.* According to its particular ecology it is closer to the genus *Leptoconchus.* However, the fact that it lives in the dead part of the coral, the general pear shape of the shell, the cancellated sculptures, the thickening of the peristome and the smooth surface between the tubercles of the embryonic shell are as many characters allowing the description of a new genus, *Reliquiaecava gen.n.*
LIÉNARD (1870, 1871) described two varieties (alpha and beta) of *L. robillardi.* Most of the material observed are globular shells resembling the beta variety. Only three shells coming from Mauritius undoubtedly belong to the alpha variety. For this variety, the host coral, the embryonic shell, and the animal are unknown. However, the shells of alpha and beta varieties are so different and no intermediate forms being observed, I think both varieties could represent separated species. Further material and observations are needed to check this hypothesis.
The study of the material of the LACM convinces me that the specimens reported by KEEN (1971, p. 546, fig. 1070) and KOSUGE & SUZUKI (1985, p. 42, fig. 3) under the name *Coralliobia cumingii* belong to *R. robillardi.* As explained in a previous paper (MASSIN 1982, p. 9), the species *C. cumingii* (H. & A. ADAMS, 1863) clearly belongs to the genus *Magilus* according to the original description: *"anfractu ultimo in tubum elongatum porrecto".*
The microstructure of the embryonic shell is very different — absence of reticular structure — from the ones observed in the genera *Leptoconchus* (MASSIN 1984) and *Coralliophila* (BANDEL 1975, MASSIN unpublished). For the first time a planispiral embryonic shell of Coralliophilidae is described without reticular structure. The embryonic shell of the genus *Reliquiaecava* is closer to the one of the genus *Thais* (see BANDEL 1975, pls. 11 & 12) than to the Coralliophilidae.
The use of the 'desert roses' as reliable microstructures is questionable. I observed them on all the shells coming from the females living in *Pavona clavus.* However, as all the observed egg capsules belong to females coming from a single colony and as 'desert roses' are not always present on the shells coming from the same egg capsule, the 'desert roses' may be artifacts.
A protoconch with three whorls indicates a planktonic veliger larva. As noted by D'ATTILIO (1972) this contributes for a lot of Coralliophilidae to have a wide zoogeographic distribution. This is obviously the case of *R. robillardi* whose geographical range extends from the East side of the Indian Ocean to the West coast of tropical America.
Contrary to the females of *Leptoconchus* spp., the females of *R. robillardi* do not possess a shell with a

particularly well developed last whorl. As a consequence there is only space for 1 to 4 egg capsules whereas females of *Leptoconchus* spp. bear up to 12 egg capsules (personal observation). The nearly absence of males is in agreement with the literature (see in BOUILLON *et al.* 1983, MASSIN 1984). One could imagine that males are dwarfs or are free living on the coral. However, both hypothesis are unlikely because the male found in *Gardinoceris planulata* was deeply burrowed in the coral and was certainly not dwarfish. The problems of the sex ratio and the reproduction still remain to be explained in the genus *Reliquiaecava* as well as in the genera *Leptoconchus* and *Magilus*.

The problem of feeding of boring species was reviewed by ROBERTSON (1970) and BOUILLON *et al.* (1983). According to the present observations, *R. robillardi* absolutely needs to be in contact with the living tissue of the host coral. This contact is assured by the tip of the proboscis. When digging into the living part the proboscis secretes a thin calcareous layer as does the siphon of some *Leptoconchus* spp. (GOHAR & SOLIMAN 1963, BOUILLON *et al.* 1983). This layer lining the funnel of the proboscis may be considered as a protection against a direct contact with the flesh of the host coral.

The position of the proboscis suggests that *R. robillardi* feeds either on the living tissue of the host coral or takes his food in the coelenteron of the polyps. I think that the second hypothesis is more likely because, the mollusc being unable to move, feeding on the coral itself, means its death within a short time.

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References

ADAMS, H. & ADAMS, A., 1853-1858. The genera of recent Mollusca. 3 vols., John VAN VORST, London.

ADAMS, H. & ADAMS, A., 1863. Descriptions of species of shells, chiefly from the Cumingian collection. *Proceedings of the zoological Society of London,* 1863: 428-435.

BANDEL, K., 1975. Embryonalgehäuse Meso und Neogastropoden (Mollusca). *Akademie der Wissenschaften und der Literatur. Abhandlungen des mathematisch-naturwissenschaftligen Klasse, Mains,* 1: 1-133 + 21 pls.

BOUILLON, J., MASSIN, C. & VAN GOETHEM, J., 1983. *Fungiacava eilatensis* SOOT-RYEN, 1969 (Bivalvia, Mytilidae) et *Leptoconchus striatus* RUPPELL, 1835 (Gastropoda, Coralliophilidae), mollusques perforant des *Fungia* (Anthozoa, Fungiidae) récoltés en Papouasie Nouvelle-Guinée. *Bulletin des Séances de l'Académie Royale des Sciences d'Outre-Mer. Classe des Sciences Naturelles et Médicales,* 4: 549-570.

D'ATTILIO, A., 1972. Remarks on Coralliophilidae (Gastropoda, Muricacea). *Festivus,* 3 (8): 2-5.

FISHER, P., 1887. Manuel de conchyliologie et de paléontologie conchyliologique, 1187 pp. + 23 pls., F. SAVY, Paris.

GOHAR, H.A.F. & SOLIMAN, G.N., 1963. On the biology of three coralliophilids boring in living corals. *Publications of the marine biological Station Al-Ghardaqa (Red Sea),* 12: 99-126.

HAYASHI, I., 1983. Larval Shell Morphology of Some Japanese Haliotids for the Identification of their Veliger Larvae and Early Juveniles. *Venus,* 42 (1): 49-58.

JABLONSKI, D. & LUTZ, R.A., 1980. Molluscan Larval Morphology. Ecological and Paleontological Applications. In RHOADS, D.C. & LUTZ, R.A. (eds.), Skeletal Growth of Aquatic Organisms, pp. 323-377, Plenum Press, N.Y. & London.

KAY, E.A., 1979. Hawaiian marine shells. In Reef and shore fauna of hawaii, section 4: Mollusca. Bernice P. Bishop Museum special Publication 64 (4): 653 pp. Bishop Museum Press, Honolulu, Hawaii.

KEEN, A.M., 1971. Sea shells of tropical West America: marine mollusks from Baja California to Peru. 2nd edition, 1064 pp., Standford University Press, Standford, California.

KOSUGE, S. & SUZUKI, M. 1985. Illustrated catalogue of *Latiaxis* and its related groups. Family Coralliophilidae. *Institute of Malacology of Tokyo, Special Publication* 1: 1-83 + 50 pls.

LIÉNARD, E., 1870. Description d'espèces nouvelles provenant de l'île Maurice. *Journal de Conchyliologie Paris,* sér. 3, T. 10, vol. 18: 304-305.

LIÉNARD, E., 1871. Description d'espèces nouvelles provenant de l'île Maurice. *Journal de Conchyliologie Paris,* sér. 3, T. 11, vol. 19: 71-74.

MASSIN, C., 1982. Contribution to the knowledge of two boring gastropods with an annotated list of the genera *Magilus* MONFORT, 1810 and *Leptoconchus* RUPPELL, 1835. *Bulletin de l'Institut royal des Sciences naturelles de Belgique, Biologie,* 53 (17): 1-28 + 1 pl.

MASSIN, C., 1984. Note on the genus *Leptoconchus* RUPPELL, 1835 (Mollusca, Gastropoda, Coralliophilidae) with the description of two new species *Leptoconchus vangoethemi* sp.n. and *Leptoconchus cyphastreae* sp.n. from Papua New Guinea. *Bulletin de l'Institut royal des Sciences naturelles de Belgique, Biologie,* 55 (1): 1-16 + 4 pls.

ROBERTSON, R., 1970. review of the Predators and Parasites of Stony Corals, with Special Reference to Symbiotic Prosobranch Gastropods, *Pacific Science,* 24 (1): 43-54.

SCHELTEMA, R.S. & SCHELTEMA, A.H., 1965. Pelagic Larvae of New England Intertidal Gastropods. III. *Nassarius trivittatus. Hydrobiologia,* 25 (3-4): 321-329.

SMITH, E.A., 1899. Notes on some marine shells from North-West Australia with descriptions of new species. *Proceedings of the malacological Society of London,* 3: 311-314.

SOWERBY, G.B. (3rd of the name), 1919. Notes on *Magilus* and it allies, substituing the generic name *Magilopsis* for *Leptoconchus lamarckii* DESHAYES. *Proceedings of the malacological Society of London,* 13: 75-77.

THIRIOT-QUIÉVREUX, C., 1980. Identification of some Planktonic Prosobranch Larvae Present of Beaufort, North Carolina. *Veliger,* 23 (1): 1-9 + 1 pl.

VAN DER SPOEL, S., 1976. Finer sculptures in euthecosomatous shells, and their value for taxonomy (Mollusca, Pteropoda). *Beaufortia,* 24 (314): 105-131.

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